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EXAMINER

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ART UNIT

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1634

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |                                       |  |
|------------------------------|--------------------------------------|---------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/521,176 | <b>Applicant(s)</b><br>OKAMURA ET AL. |  |
|                              | <b>Examiner</b><br>NARAYAN K. BHAT   | <b>Art Unit</b><br>1634               |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 February 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 17-30 is/are pending in the application.
- 4a) Of the above claim(s) 23-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 17-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 15, 2008 has been entered.

### ***Status of the Claims***

2. This action is in response to papers filed on February 15, 2008 in which claims 1-16 were cancelled, new claims 17-30 were added. All of the amendments have been thoroughly reviewed and entered.
3. The previous rejections under 35 USC § 102 (b) and 103(a) not reiterated below are withdrawn in view of cancellation of the claims. Applicant's arguments have been thoroughly reviewed and are addressed following the rejections.
4. Claims 17-30 are pending in this application.

### ***Election/Restrictions***

5. Newly submitted claims 17-30 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:  
  
Group I claims 17-22 are drawn to a solid support.  
  
Group II claims 23-and 24 are drawn to method of producing solid support.

Group III claims 12-16 are drawn to method of immobilizing nucleic acid molecules and detection.

The inventions listed as Groups I-III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The group I invention is drawn to solid support having a substrate and an electrostatic layer comprising positively charged compound on the substrate and a chemically modifying layer on the electrostatic layer having a functional group capable of binding to nucleic acids are taught by Mao et al (WO 03/020425 filed Aug. 28, 2002, See Fig. 1F, Substrate with First and Second layer, pgs. 9-13, section 6.1.1) and therefore is not a contribution over the prior art. Thus, there is no special technical feature linking the recited groups, as would be necessary to fulfill the requirements for unity of invention.

Furthermore, since applicant has received an action on the merits for the originally presented invention drawn to group I, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 23-30 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

6. Claims 17 -22 are under prosecution.

### ***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 17-20 are rejected under 35 U.S.C. 102(a) and 102(e) as being anticipated by Mao et al (WO 03/020425 filed Aug. 28, 2002).

Regarding claim 17, Mao et al teaches a solid support comprising a substrate with multi-layer coated materials on the surface (Fig. 1 shows a Substrate with First and Second layer in different permutation and combination, pgs. 9-13, section 6.1.1). Mao et al teaches a first layer is bound to the substrate with polymeric material comprising of cationic charge (Fig. 1F, See the cationic molecule layer labeled with + sign, pg. 13, section 6.1.2) and further teaches that polymeric material comprises positively charged amino group (pg. 14, lines 11-15). The first layer of Mao et al containing cationic charge is the electrostatic layer as defined in the instant specification (Instant specification, USPGPUB, paragraph 0041).

Mao et al also teaches a second layer bound to the first layer (Fig. 1F, second layer, pg. 4, lines 13-18) and further teaches that the functional groups are attached to the second layer capable of covalently binding other molecules including binding to a nucleic acid molecule (pg. 8, lines 19-27), thus teaching a chemically modifying layer on the electrostatic layer making it possible to introduce a functional group capable of

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covalently binding other molecules including binding to a nucleic acid molecule.

However, it is noted that recitation of capable of covalently binding to a nucleic acid molecule is a recitation of the intended use of the substrate, which does not further improve the structural feature of the product, i.e., substrate.

Regarding claim 18, Mao et al teaches the second layer, i.e., chemically modifying layer contains a carboxylic acid group (pg. 14, lines 28-30, pg. 15, line 1).

Regarding claim 19, Mao et al teaches a solid support wherein the first layer, i.e., an electrostatic layer comprises an amino group-containing polymer, polylysine (pg. 14, lines 11-15) and further teaches that the polymer binds to the substrate by an electrostatic interactions (pg. 4, lines 15-16), thus teaching an amino group containing compound that does not covalently bind to the substrate.

Regarding claim 20, Mao et al teaches an embodiment wherein the first layer, i.e., an electrostatic layer comprises an amino group-containing compound (pg. 14, lines 11-15) and further teaches that the polymer binds to the substrate through covalent bonds (pg. 4, lines 15-16), thus teaching an amino group containing compound that does covalently bind to the substrate. Mao et al also teaches that the first layer comprising of amino group forms an amide bond with the carboxyl group of the polymer of the second layer (pg. 20, lines 25-29) thus teaching a compound containing an amino group at the terminus to which the substrate does not bind.

9. Claim 22 is rejected under 35 U.S.C. 102(a) and 102(e) as being anticipated by Mao et al (WO 03/020425 filed Aug. 28, 2002) further evidenced by Langer et al (Reviews in Scientific Instruments, 1997, 68, 1510-1513).

Claim 22 is dependent from claim 17. Teachings of Mao et al regarding claim 17 are described in this office action on pages 3 and 4.

Regarding claim 22, Mao et al teaches a solid support comprising gold metal (pg. 9, lines 27-28), which is a highly thermal conducting metal and has a thermal conductivity of 318 W/m.K, i.e., 3.18 W/cm.K as further evidenced by Langer et al (Fig. 5, See legend, pg. 1512, column 1, paragraph 1). It is noted that the reference of Langer et al is used only to substantiate the known property of gold metal.

### ***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 17 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mao et al (WO 03/020425 filed Aug. 28, 2002) in view of Woo et al (USPN 5,929,194 issued July 27, 1999).

Claim 21 is dependent from claim 17. Teachings of Mao et al regarding claim 17 are described in this office action on pages 3 and 4.

Regarding claim 22, Mao et al teaches a variety of amino group containing compounds including polylysines (pg. 5, line 1-8), but is silent about that amino group containing compound polyarylamine. However, amino group containing compound polyarylamine was known in the art before the claimed invention was made as taught by Woo et al, who teaches polyarylamine for coating substrates and forming films on the substrate carrying positive charges (column 4, lines 8-10). Woo et al further teaches that coatings with arylamine are solvent resistant (column 4, lines 10-11) and are useful as a fluorescent coatings, as a protective coatings for electronic devices (column 14, lines 13-17).

It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to include the polyarylamine coated substrate of Woo et al in the solid support of Mao et al with the expected benefit of generating fluorescent coatings, protective coatings for electronic devices as taught by Woo et al (column 14, lines 13-17), thus expanding the capabilities of the solid support of Mao et al.



***Response to Remarks from the Applicants***

***Claim Rejections Under 35 U.S.C. § 102(a) and 102(e)***

12. Applicant's arguments with respect to claims 17-30 by Pantano et al have been considered but are moot in view of the new grounds of rejection necessitated by newly added claims.

Applicant's arguments with respect to claims 17-30 by Schwartz have been considered but are moot in view of the new grounds of rejection necessitated by newly added claims.

***Conclusion***

13. No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Narayan K. Bhat whose telephone number is (571)-272-5540. The examiner can normally be reached on 8.30 am to 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ram R. Shukla can be reached on (571)-272-0735. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Narayan K. Bhat/

Examiner, Art Unit 1634

Narayan K. Bhat, Ph. D.

/BJ Forman/

Primary Examiner, Art Unit 1634